quartz; d) the intensity of scattering in the irradiated quartz depends on the orientation of the crystal. The X-ray analysis shows that the third order symmetry C_3 is changed to sixth order C_6 by the irradiation and there is a significant change in the distribution of diffuse scattering. As a result of neutron irradiation, the structure of α-quartz is thought to change in the following manner: 1) Initially, defects develop which lead to a weakening and breaking of the Si-O bond and hence to the possibility of rearrangement in the Si-O tetrahedrons. 2) At a definite stage of the exposure the α-quartz becomes unstable and there is a transition to the more symmetrical high temperature modification. This remains stable at room temperature. 3) There is a complete loss of orientation in parts of the crystal. There are 4 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova (Moscow State University imeni M.V.Lomonosov).

SUBMITTED: July 10, 1962

Card 2/2

KOLONTSOVA, Ye.V.; MIKHAYLOVA, L.K.

Two-dimensional defects in plastically deformed crystals.
Kristallografiia 8 no.6:900-905 N-D'63. (MIRA 17:2)

1. Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova.

ZHDANOV, G.S.; ZUBOV, V.G.; KOLONTSOVA, Ye.V.; OSIPOVA, L.P.; TELEGINA, I.V.

Radiation effects in α-quartz. Kristallografiia 8 no.2:207-212 Mr-Ap '63. (MIRA 17:8)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

ACCESSION NR: AP4024997 S/0070/64/009/002/0282/0284

AUTHORS: Kolontsova, Ye. V.; Telegina, I. V.

TITLE: Change in the structure of pentaerythrite when irradiated with x-rays

SOURCE: Kristallografiya, v. 9, no. 2, 1964, 282-284

TOPIC TAGS: pentaerythrite, x ray, pentaerythrite structure, irradiation, irradiate crystal, reflection intensity, point defect, dislocation, dislocation loop, fragmentation

ABSTRACT: It has been found that the intensity of reflected monochromatic rays from pentaerythrite does not remain constant but increases slightly at first and then declines. The "useful lifetime" of a crystal, when the intensity of reflection is still rather high and to some degree constant, varies from crystal to crystal, generally ranging from 50 to several thousand hours. The authors have investigated the nature of structural change giving rise to this phenomenon. Irradiation was produced by a BSV-1 tube with Mo anode, a current of 10 ma, and a voltage of 45 kv. Irradiation time ranged from 20 to 950 hours. Laue patterns were photographed to trace the structural changes. These were compared with the

Card 1/[illegible]

ACCESSION NR: AP4024997

patterns of a crystal not subjected to irradiation. A difference began to appear at 40-50 hours, and irradiated crystals exhibited increased intensity of diffusion maximums and expansion of the Laue spots. These changes became clearer with prolonged irradiation. After 80-100 hours of irradiation, a well-defined asterism appeared on the Laue patterns, a definite indication of separation of the single crystal into separate segments, variously oriented. After about 200 hours, no further reorientation occurred, but the actual time differed for different crystals. It thus appears that the intensity of x-ray reflection weakens because of "fragmentation" in the crystal through irradiation. Decrease in intensity of reflection is due also to radiation defects in the fragments themselves. It is concluded that point defects arise because of the irradiation, and, when the concentration of defects is considerable and their mobility high, they form stable complexes. Changes in the form and size of these complexes at different stages of irradiation explain the changes in intensity of diffusion maximums, the loss of transparency, and the lamination of strongly irradiated crystals. Fragmentation may be related to the "collapse" of these accumulations (complexes) at some definite stage of irradiation and to the formation of dislocation loops, which are free to generate dislocations under proper conditions. Orig. art. has: 2 figures.

Association: Moskovisky gosudarstvenny*y universitet im. M. V. Lomonosova (Moscow State University.)

Card 2/[illegible]

ACCESSION NR: AP4039393 S/0070/64/009/003/0342/0346

AUTHORS: Telegina, I. V.; Kolontsova, Ye. V.

TITLE: Kinetics of oriented defects in irradiated crystals of LiF

SOURCE: Kristallografiya, v. 9, no. 3, 1964, 342-346

TOPIC TAGS: oriented defect, anomalous scattering, lithium fluoride, neutron bombardment, two dimensional defect, diffraction, radiation defect, radiation effect, defect formation

ABSTRACT: The authors have employed anomalous scattering to study the defect structure of single crystals of LiF after neutron bombardment at an integral flux ranging from $5 \cdot 10^{16}$ to 10^{19} neutrons per cm^2 (for fast neutrons). At values of $3 \cdot 10^{17}$ to $7.5 \cdot 10^{18}$ neutrons per cm^2, two-dimensional defects appear, oriented in the {100} and {111} planes of the initial crystal. These defects are described as two-dimensional zones having scattering capacities differing from average values. The dimensions of these two-dimensional zones change in similar fashion with an increase in integral flux and with an increase in temperature during annealing

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ACCESSION NR: AP4039393

of the crystal (for any particular radiation dose). On the basis of changes in the effects of two-dimensional diffraction during irradiation and during annealing, and also because of similarities in two-dimensional diffraction in deformed and irradiated crystals, it is suggested that the most probable origin of the two-dimensional zones is related to segregations of vacancies in the {100} and {111} planes. In addition to the two-dimensional zones in LiF crystals irradiated by a flux greater than $3 \cdot 10^{17}$ neutrons per cm^2, one may observe defects oriented relative to the initial crystal that create effects of one-dimensional diffraction along {100}. Orig. art. has: 1 figure.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 16Sep63 ATD PRESS: 3081 ENCL: 00

SUB CODE: SS, IC NO REF SOV: 005 OTHER: 006

Card 2/2

L 2436-66 EWT(1)/EWT(m)/EPF(c)/EPF(n)-2/T/EWP(t)/EWP(b)/EWA(c)
IJP(c) JD/JW /JG/GG/GS

ACCESSION NR: AT5023806 UR/0000/62/000/000/0264/0267

AUTHOR: Telegina, I. V.; Kolontsova, Ye. V.; Zubenko, V. V.

TITLE: Radiation damage in lithium fluoride crystals

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya, Moscow, Izd-vo AN SSSR, 1962, 264-267

TOPIC TAGS: lithium fluoride, irradiation damage, neutron irradiation

ABSTRACT: Neutron-irradiated lithium fluoride single crystals were investigated by means of anomalous x-ray scattering with monochromatized Mo radiation. In crystals bombarded with a total flux of (3-6) 10^{18} n/cm^2, two-dimensional disturbances oriented along the [100] and [111] planes were observed. Annealing of the crystals eliminates these disturbances almost completely, but even after prolonged annealing at 650C, the disturbances oriented along planes of type (100) are preserved. At annealing temperatures above the melting point of lithium, the separation of metallic lithium having a body-centered Bravais lattice is observed in the irradiated crystals. Almost no two-dimensional diffraction effects are observed on x-ray powder patterns of single crystals irradiated with a flux up

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L 2436-66
ACCESSION NR: AT5023806

to 1 x 10^{19} n/cm^2. It is concluded that an intense radiation annealing takes place during the irradiation. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 18Aug62 ENCL: 00 SUB CODE: NP, SS

NO REF SOV: 002 OTHER: 015

Card 2/2

L 8581-66 EWT(m)/T/EWP(t)/EWP(b) EWA(h)/EWA(c) IJP(c) JD/JG

ACC NR: AT5023805 SOURCE CODE: UR/0000/62/000/000/0257/0263

AUTHOR: Kolontsova, Ye. V.

ORG: none

TITLE: Radiation and deformation defects in crystals

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 257-263

TOPIC TAGS: irradiation, roentgen irradiation, neutron irradiation, plastic deformation, crystal defect, radiation crystal defect, deformation crystal defect

ABSTRACT: The effect of x-ray or neutron irradiation and of plastic deformation on the structure of ionic crystals (LiF, NaCl, KCl, AgCl) and of metal crystals (Al, Zn, Cd, Sn) has been investigated. It was found that both irradiation and deformation generate additional interference patterns which appear on the backgroumd of diffusion peaks. As the intensity of irradiation or deformation increases, the number of these patterns increases to such an extent that they form a single arched dash. Under the effect of irradiation or deformation, single crystals break into fragments and their orientation becomes disrupted. The extent of crystal fragmentation depends on the crystal structure and the intensity of irradiation or

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L 8581-66

ACC NR: AT5023805 3

amount of deformation. The changes in LiF crystal structure induced by neutron irradiation and plastic deformation are identical, as proved by the increase in the appearance of diffusion peaks observed furing neutron irradiation of diamond, silicon, molybdenum, and quartz single crystals and in the deformation of aluminum single crystals. Since the changes in crystal structure produced by irradiation and deformation are similar, the residual defects in crystals produced by deformation and irradiation are also similar. Orig. art. has: 5 figures. [ND]

SUB CODE: MM,SS/ SUBM DATE: 18Aug62/ ORIG REF: 011/ OTH REF: 005

Card 2/2 pb

KOLONTSOVA, Ye.V.; TELEGINA, I.V.

Structural changes in neutron irradiated α-quartz. Fiz. tver. tela 7 no.9:2730-2734 S '65. (MIRA 18:10)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.

ACC NR: AP6037007 (A,N) SOURCE CODE: UR/0181/66/008/011/3412/3414

AUTHOR: Kolontsova, Ye. V.; Telegina, I. V.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Structural variations in quartz during the α → β transition and following neutron irradiation

SOURCE: Fizika tverdogo tela, v. 8, no. 11, 1966, 3412-3414

TOPIC TAGS: quartz, phase transition, neutron irradiation, neutron scattering, temperature dependence, atomic property

ABSTRACT: This is a continuation of earlier work (FTT v. 7, 27, 1965) dealing with phase transitions induced in quartz by neutron irradiation. The authors compare the changes as recorded by the diffuse-scattering method or by the Lane method when α quartz is heated, with the structural transformations observed in α quartz following neutron irradiation. The results show that with increasing temperature the temperature α → β transition is quite close to the structural changes which are observed in α quartz bombarded with neutrons at fluxes from 10^{19} to (5 -- 6) x 10^{19} neut/cm^2. Evidence in favor of this statement is afforded by the gradual nature of the diffuse scattering and by comparisons of the behavior of the Lane maxima and the diffuse

ACC NR: AP6037007

maxima. The authors interpret the closeness of the structural transitions as a natural result of the fact that the transitions are results of displacements, which should exert the same effect on the atomic fields irrespective of the causes of the displacements. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 25Mar66/ ORIG REF: 005/ OTH REF: 002

Card 2/2

KOLONTYRSKAYA, Ye.

A collective's will. Leg.prom. 7 no.11:32-33 N '47. (MLRA 6:11)
(Textile industry)

DOKUCHAYEV, V.M., dots.; KOLONUTOV,G ., nauchn. red.

[Chemistry in weed control] Khimiia v bor'be s sorniakami. Stavropol', Stavropol'skoe knizhnoe izd-vo, 1964. 33 p. (MIRA 18:8)

1. Stavropol'skiy sel'skokhozyaystvennyy institut (for Dokuchayev).

KOLORZ, A.; LOHBERG, K.;

Interface reaction between liquid cast iron and molding material with special regard to carbonaceous additions to the molding sand. Slevarenstvi 11 no.8/9:374-382 Ag '63.

1. Institut fur Giessereitechnik, Dusseldorf.

KOLOS, A.V. (Moskva)

Refining of the classical theory of bending of circular plates.
Prikl. mat. i mekh. 28 no.3:582-589 My-Je'64 (MIRA 17:7)

L 41657-65 EWT(d)/EWT(m)/EWA(d)/EWP(w) EM

ACCESSION NR: AP5006263 S/0040/65/029/001/0141/0155

27

B

Gol'denveyzer, A. L. (Moscow); Kolos, A. V. (Moscow)

...ntribution to the construction of the ... equations of the ... elastic plates

... matematika i mekhanika ... 141-155

...lasticity theory, elast... ...mechanical ... measurement, stress calculation

... discuss ways ... thin elastic plates ... up to now ... based on the use of power series of ... asymptotic inte- ... papers such ... equations of elasticity theory ... of these methods ... asymptotic ... the problem of the general ... mean sur- ... in arbitrary orthogonal system ... coordinates. Orig. ... formulas.

KOLOS, A.V. (Lugansk)

Methods for refining the classical theory of flexure and distention of plates. Prikl. mat. i mekh. 29 no.4:771-781 Jl-Ag '65.
(MIRA 18:9)

KOLOS, A. YE.

KOLOS, A. YE. Abdominal hernias in horses.

So: Veterinariya; 23; 5-6; May/June 1946; Uncl.
TABCON

KOLOS, A. YE.

KOLOS, A. YE. Post-operative treatment of hemiplegia of pharynx in horses.

So: Veterinariya; 23; (12); December 1946; Uncl.
TABCON

KOLOS, A. Ye., Sr. Sci. Co-Worker
All-Union Inst. of Exptl. Veterinary Med.
"Intravenous injection of medicinal agents into a horse."
SO: Veterinariia 24(1), 1947, p. 34.

KOLOS, A. Ye.

USSR/Diseases of Farm Animals. The Pathology of Multiplication R-3

Abs Jour: Ref Zhur - Biol., No 1, 1959, 2837

Author : Kolos, A. Ye.
Inst : Bashkirian Institute of Agriculture
Title : Data on the Etiology, Pathogenesis, and Treatment of Postnatal Diseases in Mares

Orig Pub: Tr. Baskirsk. s.-kh. in-ta, 1957, 8, No 2, 415-426

Abstract: No abstract

Card 1/1

Distr: 4E3b/4E2c(j)

The reactivity of some ionized hydrocarbons. B. Kołos. (Inst. Badań Jądrowych, Warsaw). *Polish Acad. Sci. Inst. Nuclear Research, Rept.* No. 119/V, 10 pp. (1958) (in Russian).—Charge distribution, free valencies, and bond orders for neutral and ionized mols. of butadiene, hexatriene, anthracene, 1,2-benzopyrene, and 1,2,3,4-dibenzopyrene are given and discussed. A. Szafrański

3
1-9-59 (NB)
2

KOLOS, E.

Assay of frangula-bark extract. S. Simon and E. Kolos (Magyar Pharma, Budapest). *Acta Pharm. Acad. Sci. Hung.* 5, 195-203 (1954) (in German).—The acetone-pptd., concd. MeOH ext. contained more total emodin than acetone-pptd. aq., aq. EtOH, or MeOH frangula-bark ext. In 2 instances official Pharm. exts. had little biol. activity. There was no parallelism between the results of biol. and chem. assays.

S. Ellis

KOLOS, Ede, a kemiai tudomanyok kandidatusa

The state and analytic chemical problems of manufacturing fine chemicals in Hungary. Kem tud kozl 20 no.3:323-326 '63.

1. Reanal Finomvegyszergyar, Budapest.

KOLOS, F.;WIEDNER, L.

KOLOS, F.;WIEDNER, L.
Completed greasing experiments with domestic sulfonated oils on chrometanned leathers. p. 81

Vol. 5, No. 4, August, 1955 Budapest, Hungary BOR-ES CIPOTECHNIKA

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 5 No. 3, March, 1956

KOLOS, F.

New Methods in the field of liming, p. 1. BORO ES CIPOTECHNIKA. (Boripari Tudomanyos Egyesulet mint a Magyar Tudomanyos Egyesuletek Szovetsege Tagegyesulete) Budapest. Vol 6, no. 1, Feb. 1956

SOURCE: East European Accessions List (EEAL), Library of Congress Vol 5, no. 6 June 1956

KOLOS, Imre, foallatorvos (Sukosd); RETI, Pal (Budapest V., Rizenberg hp.u.17)

Motorists' letters. Auto motor 13 no.21:8 1 N '60.

KOLOS, I.

In an Azov machine repair station. Sov.profsoiuzy 6 no. 9:54-56 Ag '58. (MIRA 11:8)
(Repair and supply stations)

KOLOS, I.

Let's reorganize the remuneration of rural machinery operators.
Sov. profsoiuzy 6 no.12:54-56 S '58. (MIRA 11:9)
(Collective farms--Accounting)

KOLOS, I.

Integrated approach. Sov.profsoiuzy 6 no.14:23-25 O '58.
(MIRA 11:12)

1. Sovkhoz imeni Stalina Skvirskogo rayona, Kiyevskoy oblasti.
(Kiev Province--State farms)

KOLOS, I.

Kuban, land of oil. Sov.profsoiuzy 7 no.2:34-37 Ja '59.
(MIRA 12:3)

(Kuban--Oil well drilling)

KOLOS, I.

New page in the life of a collective-farm village. Sov. profsoiuzy 7 no.4:45-48 Fe '59. (MIRA 12:5)
(Ivanovskoye--Agricultural laborers)

KOLOS, I.A.; ORLOV, V., red.

[People of the great flight] Liudi bol'shogo poleta. Moskva, Politizdat, 1965. 117 p. (MIRA 18:7)

PAL, Mihaly (Budapest); KULOS, Janos (Budapest)

Forum of innovators. Ujit lap 16 no.14:30-31 25 Jl '64.

KOLOS, L.

766. Pneumatic valve for inflatable members. "LICENCIA" TALÁLMÁNYOKAT ÉRTÉKESÍTŐ VÁLLALAT, inv. L. Kolos. U.S.P. 2710623, appl. 17.1.62; Hungary 4.7.61; acc. 14.6.65. A valve for bladders of balls, inner tubes of tyres, and the like, comprises an integral body of resilient material having a longitudinal central portion and a pair of flanges formed at opposite ends of the central portion and defining a recess between them to receive a reinforcing member around the central portion, and a passage extending through the flanges and central portion, this passage being defined by a pair of flat slits extending in intersecting planes, narrowing towards each other and meeting at the meeting point of the adjacent apices of the triangular conformations defining the slits. 66Q312313.1

(1)

KOLOS, L.A., assistent

Permeability to air of a couble-layer sleeve in a specific case. Nauch.trudy MTILP no.23:150-154 '61. (MIRA 15:9)

1. Kafedra teplotekhniki Moskovskogo tekhnologicheskogo instituta legkoy promyshlennosti.

(Coats)

KOLOS, L.A., assistent

Wear of the heel in multiple repeated loading. Nauch. trudy MTILP no.29:150-151 '64. (MIRA 18:4)

1. Kafedra teplotekhniki Moskovskogo tekhnologicheskogo instituta legkoy promyshlennosti.

KOLOS, L.A., starshiy prepodavatel'

Lead action on the heels. Nauch. trudy MTILP no.30:136-139 '64.

Impact load on heels. Ibid.:140-142

(MIRA 18:6)

1. Kafedra teplotekhniki Moskovskogo tekhnologicheskogo instituta legkoy promyshlennosti.

KOLOS, L.A., assistant

Heel wear. Nauch. trudy MTILP no.27:173-174 '63.
(MIRA 17:11)

1. Kafedra teplotekhniki Moskovskogo tekhnologicheskogo instituta legkoy promyshlennosti.

KOLOS, N.D., inzh.; VORONCHIKHIN, G.P., inzh.

Simple method for preparing metal surfaces fo. painting.
Mashinostroenie no.1:76-78 Ja-F '65. (MIRA 18:4)

Kolos, P

2

Matl

97. **Stuffing experiments with domestic sulphonated oils on chrome-tanned leathers.** P. Kolos, L. Wjedue. *Bőr- és Cipőtechnika*. Vol. 5, 1955, No. 4, pp. 81–86. 7 figs., 4 tabs.

Stuffing experiments had been conducted on leathers where the circumstances of manufacture and their applications differed greatly namely chrome-side leather made from native hides and glove leather. For chrome-side leather a standard liquoring method with sulphonated sunflower-seed oil was applied. It was found that from the available oils rapeseed oil is more adequate for liquoring purposes than sunflower-seed oil. The best results were obtained with rapeseed oil having a sulphonation degree of 19 ± 1. Thus it was possible to reduce the quantity of grease used by 20% and furthermore the obtained leather possessed better properties (closed grain, smaller moulder-side, elastic and soft touch). In spite of some statements in literature which claim that sulphonated train oils are best it was found that sulphonated neats' foot oil was superior for stuffing glove leather from pig skin bellies. Fatty spews do not necessarily occur in stuffing with neats' foot oil; this phenomenon is primarily due to incorrect sulphonation or to the oxidized fatty acids enriched by excessive sulphonation. It could be established that sulphonated neats' foot oil with a sulphonation degree of 19 ± 1 produced the best results if the sediments consisting principally of oxidated fatty acids do not exceed 5% by volume.

KOLOS, P.

Tracks on sectionalized prestressed-concrete ties with concrete slits.

p. 213 (Przeglad Kolejowy Drogowy. Vol. 8, no. 9, Sept. 1956. Warszawa, Poland)

Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 2, February 1958

KOLOS, P. I.

USSR / Soil Science. Cultivation. Melioration. Erosion. J-5

Abs Jour: Ref Zhur-Biol., No 8, 1958, 34433.

Author : Panenko, I. D., Kolos, P. I.
Inst : Moldavian Experiment Station for Irrigation of Vegetables and Potatoes.
Title : Importance of Power Irrigation for the Increase of Yield of Agricultural Cultivations.

Orig Pub: Tr. Mold. ovoshcho-kartof. orosit. opyt. st. Kishinev, Gosizdat Moldavii, 1956, 77-92.

Abstract: Power irrigation permits a better utilization of moisture, and is more effective in agricultural cultivations, increasing the yield as follows: apple trees - by 16-50%, viticulture - by 23-35%, tomatoes by 37%, potatoes by 41%, and that of winter wheat on black fallow by 36-90%. The highest yields obtained, were those in combined power

Card 1/2

Kolos, P. I.

Watering of vineyards in southern part of the Dnestr Valley. P. I. Kolos. *Sadovodstvo, Vinogradarstvo i Vinodelie Moldavii* 11, no. 4, 16-20(1956).—Watering of vineyards in the region 3 times during the [illegible] 700 cu.m. water/ha. treatment [illegible] by 16-47 centners/ha. without affecting the grape qualities (sugar 13.16-22.72%; total acidity 0.[illegible]-0.[illegible]3 g./l. must, alc. content of the wine 12.7-13.8%). E. Wierbicki

KOLOS, R.

TECHNOLOGY

PERIODICAL: MAGYAR HIRADASTECHNIKA. Vol. 9, no. 2/3, June 1958

Kolos, R. The results of the Exhibition of Telecommunication Engineering and the third Conference of Telecommunication Engineering. p.45.

Monthly list of East European Accessions (EEAI) LC, Vol. 8, No. 2, February 1959, Unclass.

KOLOS, Richard, egyetemi tanar; FISCHER, Imre; HARSANYI, Istvan, dr., docens, kozgazdasagi tudomanyok kandidatusa; LENGYEL, Karoly, dr., tudomanyos munkatars; BALASSA, Laszlo, foeloado; KOZMA, Pal, dr., fokonyvelo; KASPER, Egon, dr.; MACSKASSY, Pal; LUKACS, Laszlo, okleveles elektromernok; SANTA, Balint, dr.

Scientific conference on retraining instrument industry personnel. Meres automat 13 no.2/3:66 '65.

1. Secretary General, Council on Science and Higher Education, Budapest (for Kolos). 2. Head, Directorate of Instrument Industry of the Ministry of Metallurgy and Machine Industry, Budapest (for Fischer). 3. Instrument Industry Research Institute, Budapest (for Lengyel). 4. National Price Office, Budapest (for Balassa) 5. Instrument and Business Machine Trading Organization, Budapest (for Kozma). 6. Group Head, Ministry of Finance, Budapest (for Kasper). 7. Directorate of Instrument Industry of the Ministry of Metallurgy and Machine Industry, Budapest (for Santa).

KOLOS, Richard, tanszekvezeto docens

National Conference on Instrumentation; presidential opening address. Meres automat 8 no.9:257-258 '60.

1. Miniszterhelyettes, es Merestechnikai es Automatizalasai Tudomanyos Egyesulet elnoke, Budapest.

(Hungary--Measuring instruments)

KOLOS, Richard, tanszekvezeto docens

Tasks of the Scientific Association of Measuring Technique and Automation. Meres automat 9 no.2:33-36 '61.

1. Miniszterhelyettes, es Merestechnikai es Automatizalasi Tudomanyos Egyesulet elnoke

KOLOS, Richard, miniszterhelyettes, tanszekvezetodocens

The chairman's opening address to the National Conference on Instrumentation. Meres automat 8 no.9:257-258 '60.

1. A MATE elnoke.

KOLOS, Richard, egyetemi tanar

Basic research and production. Elet tud 17 no.47:1483-1484 25 N '62.

1. Tudomanyos es Felsooktatasi Tanacs fotitkara.

HEROUT, V.; KOLOS, T.; PLIVA, J.

Terpenes. Part 49. Sesquiterpenes of the cadinene type in Javanese citronella oil [abstract; in English]. Sbor.Chekh.khim.rab. 18 no.6: 886 D '53. (MLRA 7:6)

1. Department of Natural Substances, Institute of Organic Chemistry, Czechoslovak Academy of Science, Prague. (Cadinene)

KOLOS, T.

HEROUT, V., KOLOS, T., PLIVA, J.
"Terpenes. Part 49. Sesquiterpenes of the Cadinene Type of Javanese Oil of Citronella," p. 440.
(Chemicke Listy, Vol.47, No.3, Mar. 1953, Praha.)

SO: Monthly List of East European Accessions, Vol.2, No.9, Library of Congress, September 1953, Uncl.

AKIMENKO, I.S.; KOLOS, T.K.; MERKIN, V.G.; SMOTRICH, B.A.; YASENSKAYA, M.T.

Method of water-and-heat treatment of corn. Ferm. i spirt.prom. 31 no.3:36-37 '65. (MIRA 18:5)

1. Lipetskiy spirtozavod.

BALON, I.D., kand.tekhn.nauk; ROMANENKO, N.T., inzh.; YUPKO, L.D., inzh.; BOLKUNOV, Ye.P., inzh.; TULUYEVSKAYA, T.A., inzh.; [illegible]STAFUROV, P.I., inzh.; VOLOVIK, A.V., inzh. Prinimali uchastiye: BAKAYEV, A.I.; VOKHNIK, A.R.; KOLOS, V.D.; KAYSTRO N.P. [deceased]; LITVINENKO, V.I.; MAKARCHENKO, N.M.; ONOPRIYENKO, V.P.; PALAGUTA, V.P.; PIKA, V.S.; RAGIN, B.I.; ROMANCHENKO, Ye.I.; SAYENKO, S.D.; STOLYAR, V.V.; SKORIK, N.M.; TOROPENKO, P.D.

Characteristics of making ferromanganese in large capacity blast furnaces and the effect of slag conditions on basic technical and economic indices. Stal' 23 no.12:1069-1073 D '63. (MIRA 17:2)

1. Ukrainskiy nauchno-issledovatel'skiy institut metallov i zavod "Zaporozhstal'".

24 (6)

AUTHORS: Severdenko, V. P., Academician, AS BSSR, SOV/20-126-5-14/69
Kolos, V. I.

TITLE: On a Field of Slide Lines (Ob odnom pole liniy skol'zheniya)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 5, pp 964 - 965 (USSR)

ABSTRACT: The solution of practical problems arising from the theory of plasticity frequently involves fields of slide lines similar to that shown by figure 1. In this case complicated numerical problems permit a solution of the problem; some particularities, however, offer a less complicated and more exact solution. A field is discussed in which families of lines originate from two centers O_1 and O_2, which intersect each other. The arcs originating from O_1 are assumed to have a common radius of curvature R, those originating from O_2 have a radius of curvature S, m lines originate from O_1 within the total angle α, and n lines from O_2 within the total angle β. These (curved) lines are separated from one another at O_1 by the angle $\Delta\alpha_i$ and at O_2

Card 1/2

by the angle $\Delta\beta_j$ (Fig 1). The authors then set up the line of the nodes $R_{m,n}$ and $R_{\alpha,\beta}$, which are transformed for an (xy)-coordinate system. Further, a formula is given for the simplified case in which $\alpha = \beta$. The authors evaluated the results numerically for a 15-degree net of lines, and the coordinates of the nodes, including the arcs of 135°, are listed in a table. The radii of the nodes are computed by the infinite series $R_{\alpha,\beta} = 1 + \frac{\alpha}{1!} + \frac{\alpha\beta}{1!1!} + \frac{\alpha^2\beta}{2!1!} + \frac{\alpha^2\beta^2}{2!2!} + \frac{\alpha^3\beta^2}{3!2!} + \ldots$. There are 1 figure, 1 table, and 2 Soviet references.

SUBMITTED: April 2, 1959

KOLOS, V.I. (Volgograd)

Insertion of concave stamp into a plastic medium. PMTF no.2:157 Mr-Ap '65. (MIRA 18:7)

KOLOS, V. I.

Cand Tech Sci - (diss) "Force and performance of deformation in stamping." Minsk, 1961. 11 pp; (Academy of Sciences Belorussian SSR, Technical Physics Inst); 100 copies; price not given; (KL, 5-61 sup, 190)

KOLOS, V.I.; TRET'YAKOV, Ye.M.

Determining the thickness of a solidified layer. Kuz.-shtam. proizv. 5 no.2:47-49 F '63. (MIRA 16:2)
(Thickness measurement)

KOLOS, V.I. (Volgograd)

Integrating equations for the plane deformation of a totally plastic body. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.1:171-173 Ja-F '63. (MIRA 16:2)
(Deformations (Mechanics)) (Plasticity)

S/179/63/000/001/025/031
E081/E135

AUTHOR: Kolos, V.I. (Volgograd)

TITLE: Integration of the plane deformation equations of an ideally plastic body

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye, no.1, 1963, 171-173

TEXT: The paper deals with the integration of the equations

$$dR - Sd\alpha = 0, \quad dS + Rd\beta = 0, \quad du - vd\beta = 0, \quad dv + ud\alpha = 0 \qquad (1.2)$$

where R, S are the radii of curvature of the characteristics; u, v are the velocities along the characteristics; α, β are angles defined as in Fig.1. These equations are developed into infinite series by successive substitution. The series are evaluated for characteristics formed by circular arcs and the results tabulated for 15° intervals of α and β. The characteristics arising from the deformation of a plastic cylinder by rigid cylinders are evaluated and illustrated, and the case of a plastic region contained between moving rigid regions is also discussed.

Card 1/2

The integration of the plane ...

S/179/63/000/001/025/031
E081/E135

There are 3 figures and 1 table.

SUBMITTED: August 1, 1962

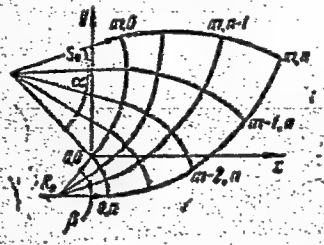


Fig. 1

Card 2/2

KOLOS, W.

Theoretical examination of the dibenzo-derivatives of perylene. In English.

p. 3, (ACTA UNIVERSITATIS SZEGEDIENSIS) Vol. 2, no. 1/4, 1956
Szeged, Hungary

SO: Monthly Index of East European Accessions (EEAI) LC, Vol. 7, No. 3, March 1958

KOLOS, Walter.

Distr: 4E3d/4E2c(j)

4
2 May
2

43. A theoretical study of the dibenzo derivatives of perylene. P. Berencz, W. Kolos, R. Pauncz. *A Magyar Tudományos Akadémia Kémiai Tudományok Osztályának Közleményei*. Vol. 9, 1957, No. 3, pp. 293—298, 2 figs.

The term systems of aromatic hydrocarbons having condensed rings consisting of anthracene or phenanthrene parts have been investigated by means of the L. C. A. O. method and comparative calculations have been made as to the practicability of perturbation computations. The calculations resulted in a qualitatively true representation of the principal characteristics of the spectra but quantitative agreement is still not satisfactory.

Kolos, W.

9
IRML

1071.

Kolos W. The Influence of Hindered Rotation on the Scattering of Slow Neutrons by Bound Protons.

Acta Physica Polonica [illegible]

The cross section of the proton [illegible]

[illegible] degree of freedom [illegible]

the cross section of the proton [illegible]

[illegible] the hindered [illegible]

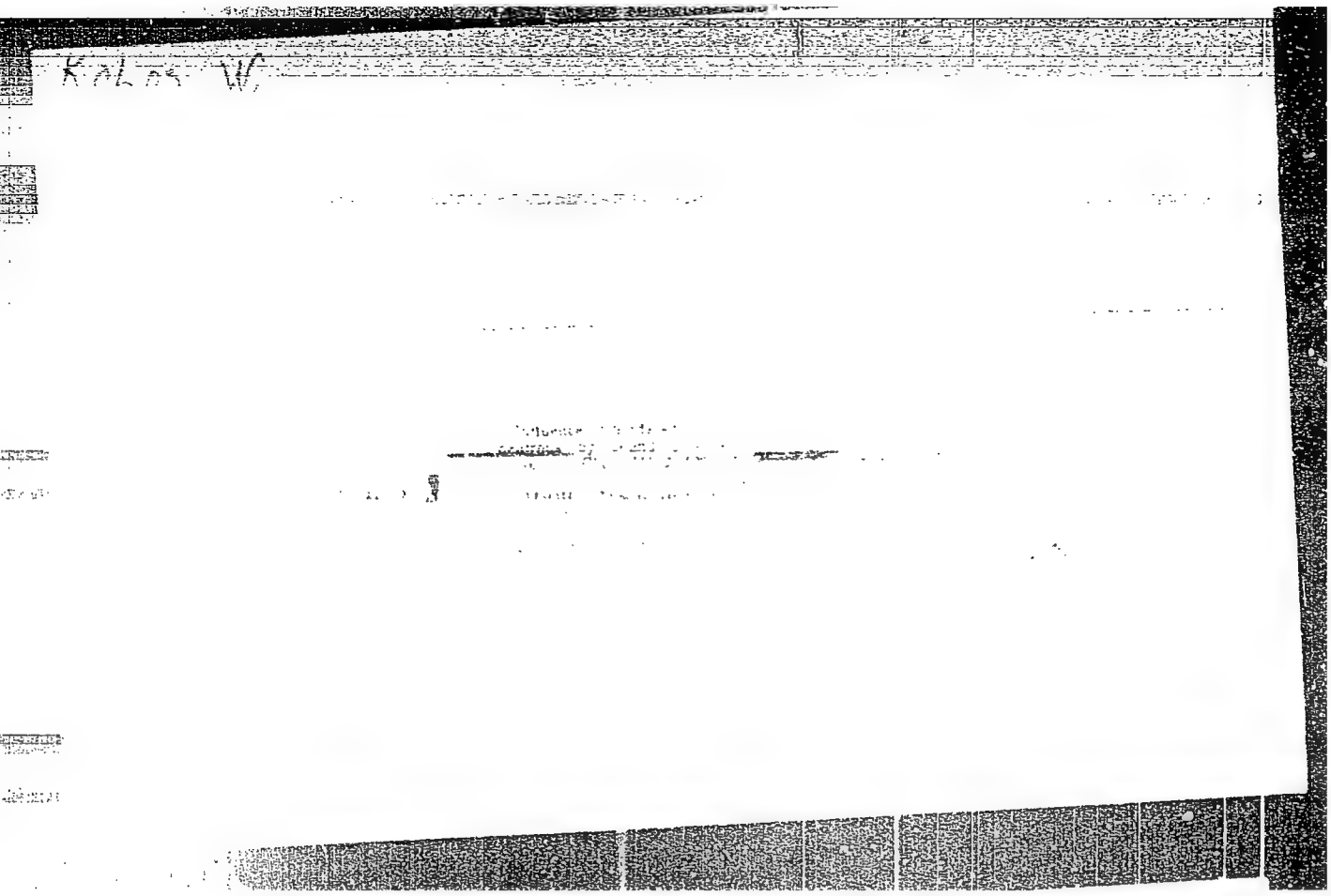
[illegible] whose molecule [illegible]

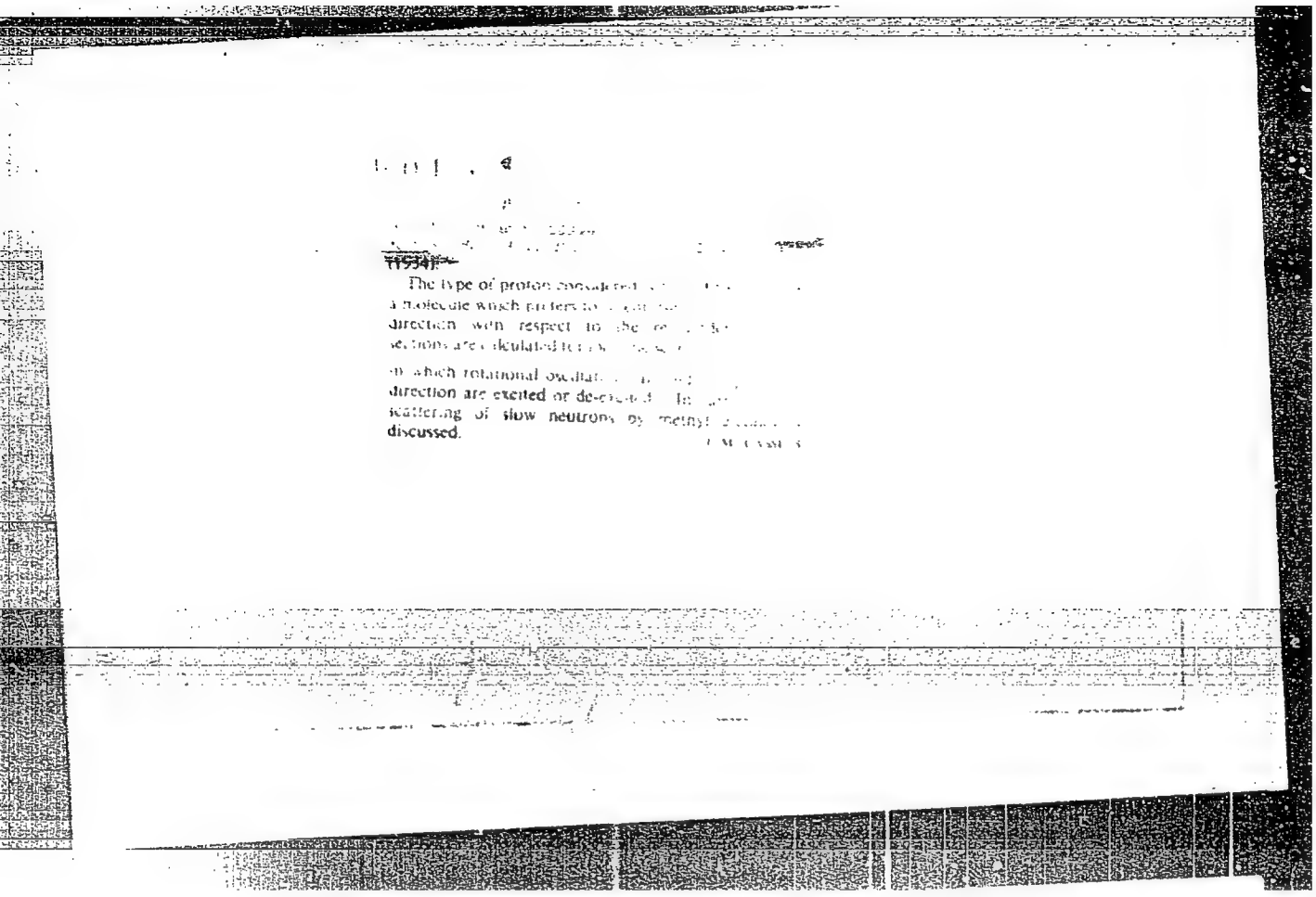
[illegible] of a proton bound [illegible]

[illegible] is that the [illegible]

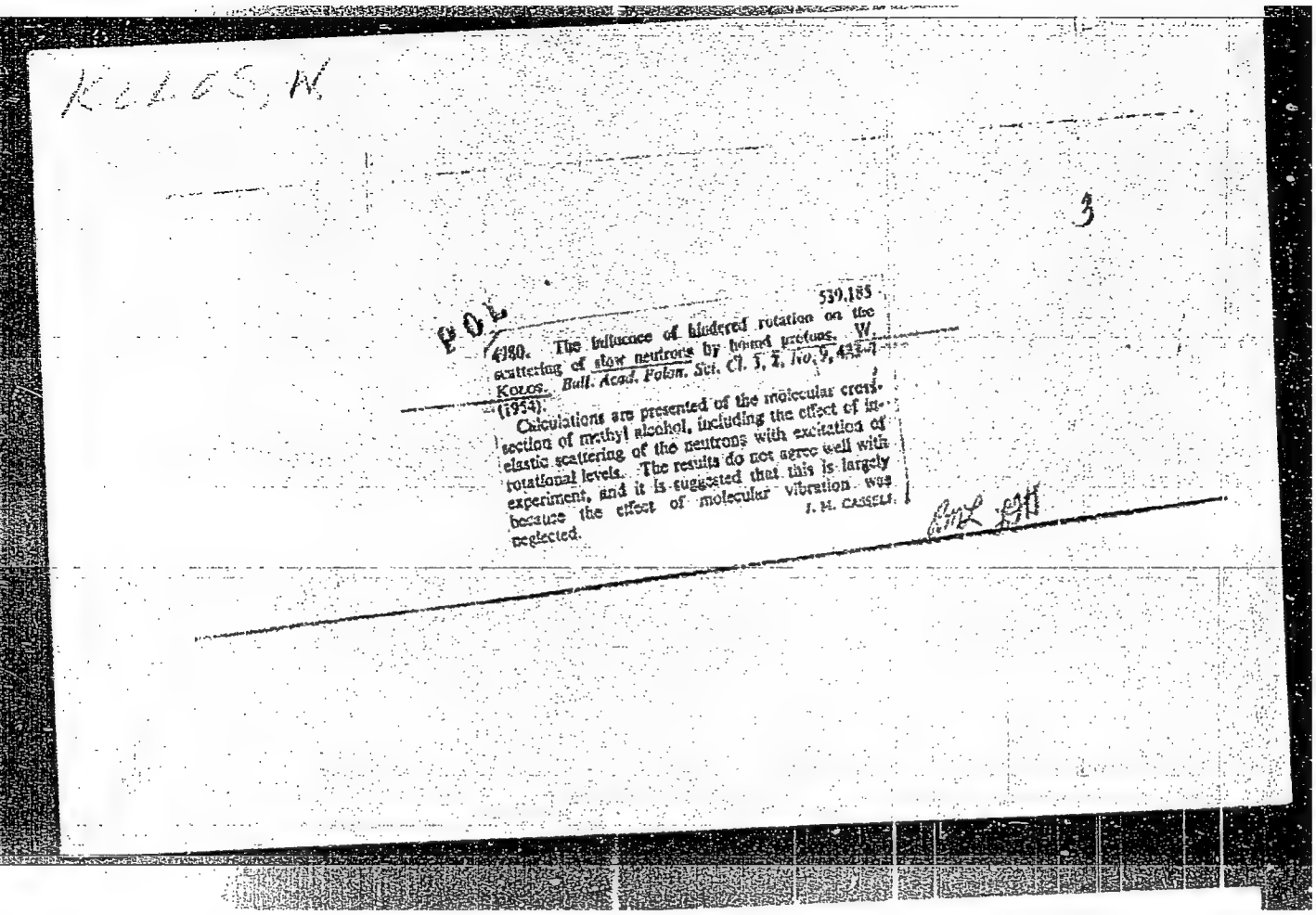
[illegible] incident neutrons [illegible]

[illegible]





The type of proton [illegible] a molecule which [illegible] direction with respect to the [illegible] sections are calculated [illegible] in which rotational oscillat[illegible] direction are excited or de-[illegible] scattering of slow neutrons by [illegible] discussed.



KOLOS, W.

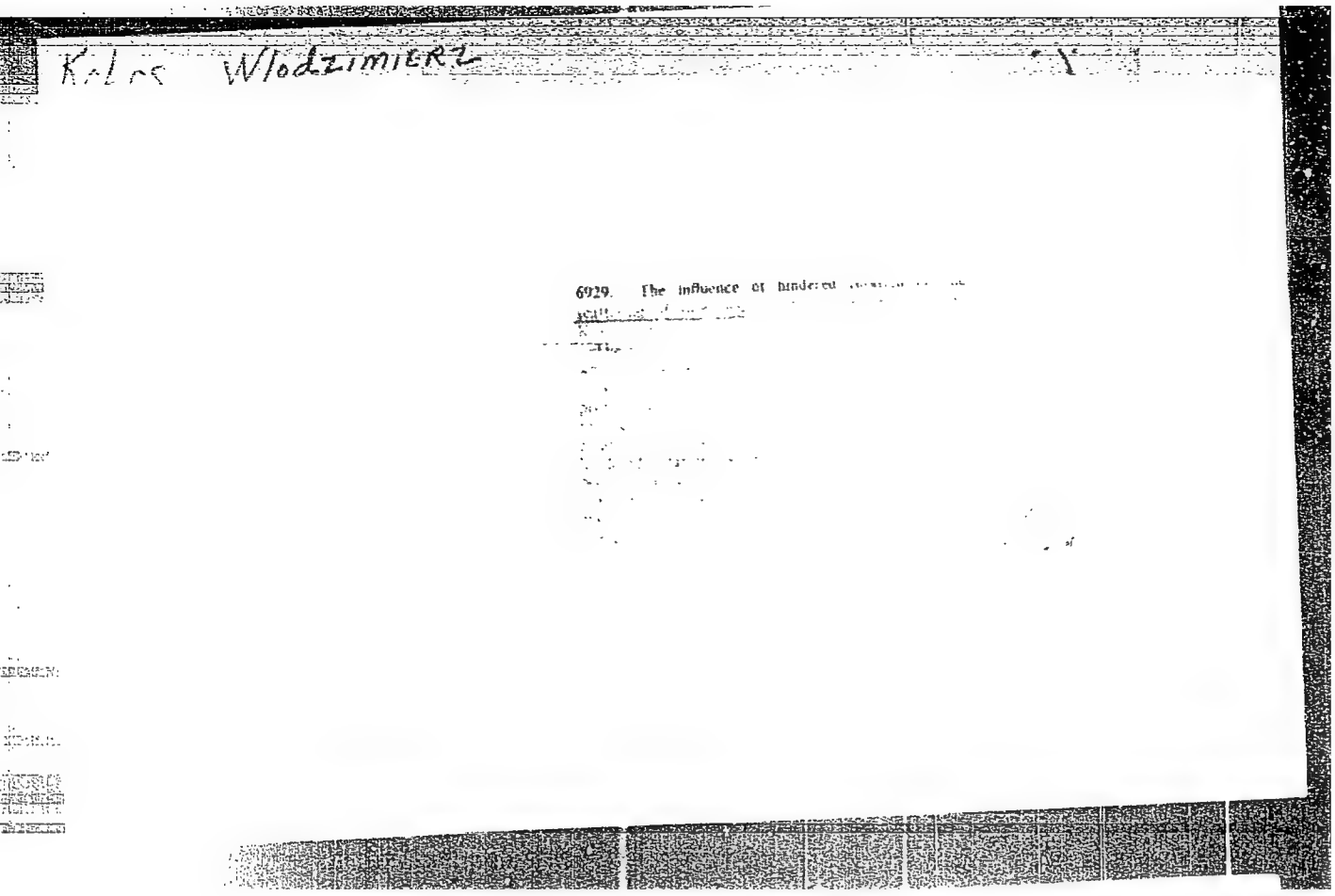
3

539.185

4980. The influence of hindered rotation on the scattering of slow neutrons by bound protons. W. KOLOS. *Bull. Acad. Polon. Sci. Cl. 3, 2, No. 9, 433-4 (1954).*

Calculations are presented of the molecular cross-section of methyl alcohol, including the effect of inelastic scattering of the neutrons with excitation of rotational levels. The results do not agree well with experiment, and it is suggested that this is largely because the effect of molecular vibration was neglected.

J. M. CASSELS.



KOLOS, W.

Tribute to Einstein. p. 269. Vol. 1, no. 3, 1955 Warszawa

SERIA B: PRZYROD A NEOZYWIONA

SOURCE: East European Acession List (EEAL) Library of Congress
Vol. 5, no. 8, August 1956

: KOLOS, W.

B-4

Category: Poland / Physical Chemistry - Molecule. Chemical bond.

Abs Jour: Referat Zhur - Khimiya, No 9, 1957, 29627.

Author : Kolos Wlodzimierz
Inst : not given
Title : The influence of Hindered Rotation on the Scattering of Slow Neutrons by Bound Protons. II.

Orig Pub: Acta phys. polon., 1955, 14, No 3, 173-182

Abstract: An investigation of the effect of hindered rotation in the molecule on cross section of neutron scattering by proton bound within the molecule. Previously (Communication I, RZhKhim, 1955, 54457) there was derived the formula for the cross section $\sigma_{mfpf,mipi} = b_0^2 \sigma_{mfmi}$, wherein σ_{mfmi} is cross section of scattering of neutrons at rigid molecule, taking into account the rotation. In the present paper is proposed a procedure of summation, by states of different mf, that is suitable for energy of neutrons, comparable with distances between rotation levels in the molecule. Use of the static approxima-

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Card : 1/3

Polish Acad Sci, Warsaw.

B-4

Category: Poland / Physical Chemistry - Molecule. Chemical bond.

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29627

tion of Placzek (Placzek G., Phys. Rev., 1952, 86, 377) permits to disregard change in energy of neutron, associated with transitions within the molecule, which simplifies summation by states in the cross section formula. Calculations are performed at Born approximation. As psi-functions are chosen the eigenfunctions of symmetrical rotator: $U_{mn}(\theta, \psi, \varphi) = \left[1/2 \pi \times (2l_m)^{1/2} \right] \Theta_{mn}(\theta) \exp\left[i (n\varphi + I \psi) \right] Q_m = t^{d/2} (1-t)^{s/2} \times F(m,t)$, where F -- hypergeometric series. Interaction of neutrons with the molecule is defined by the known Fermi potential $V = \sum m_i \delta (r - r_i)$. Finally the cross section is written in the form:

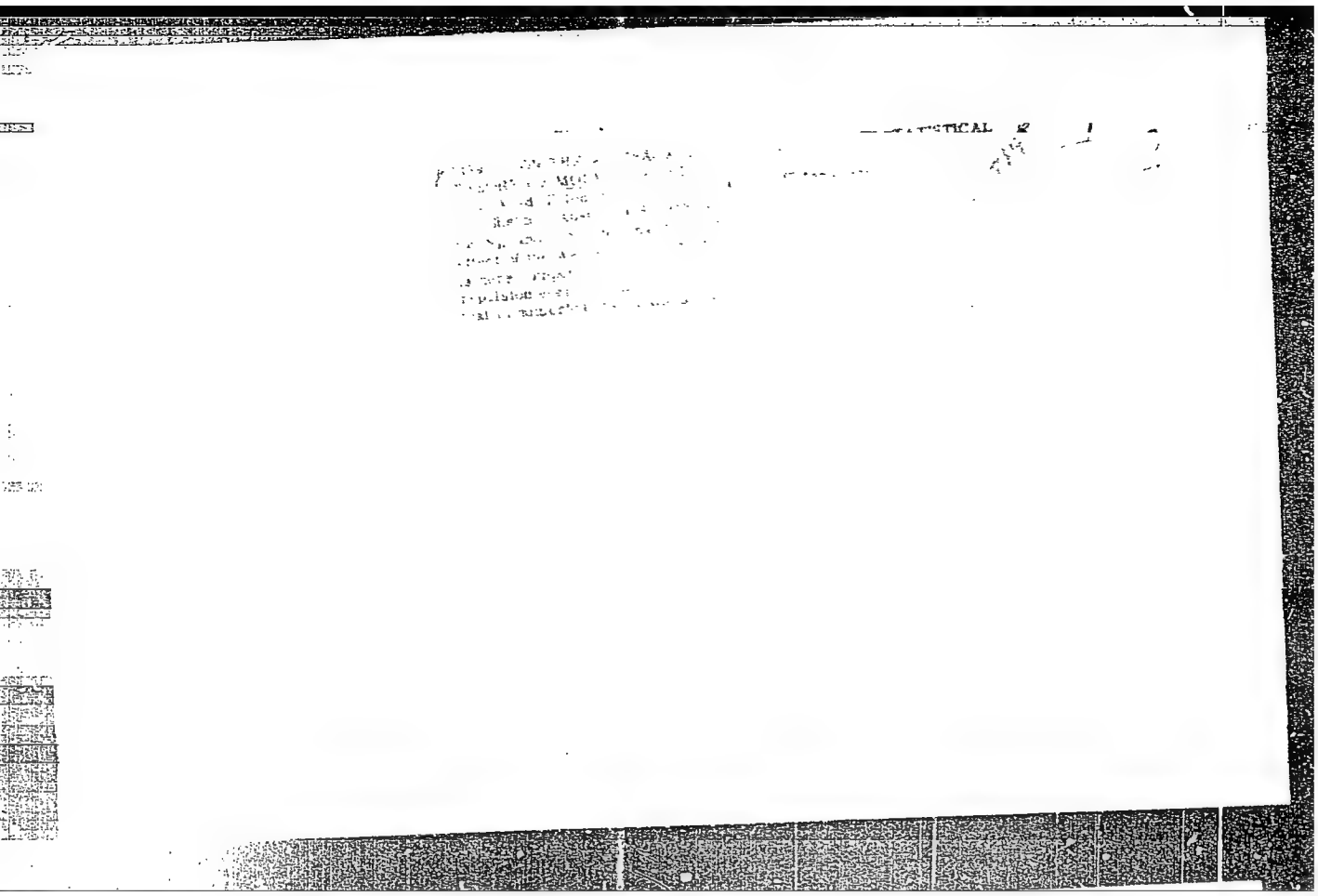
$\sigma_m = \left[4 \sigma_0 (\mu_1 \mu_2 \mu_3)^{1/2} / I_{mn} \right] \times \sum_{\tau f} \sum_{N=0}^{\infty} (-1)^n D_+ \tau_f / n! (2\tau_f + n)!$.

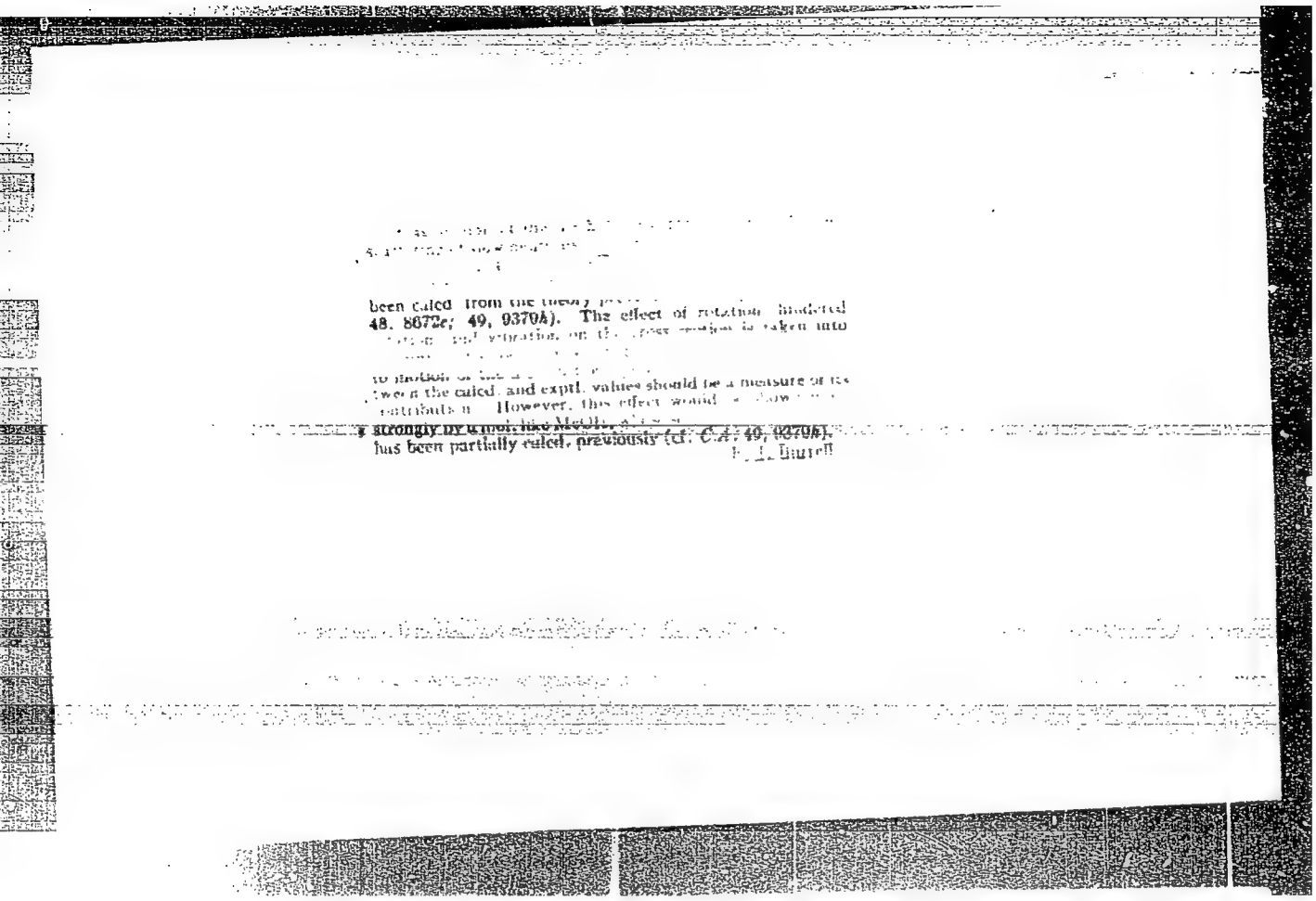
wherein $\mu_1 \mu_2 \mu_3$ -- principal values of reduced tensor of molecule masses;

$I_{mn} = \int_0^1 t^n (1-t)^s F^2 (m, t)\, dt$, and D_+ -- number series.

-21-

Card : 2/3





been calcd. from the theory [illegible] 48, 8672e; 49, 9370h). The effect of rotation [illegible] [illegible] vibration, on the [illegible] is taken into [illegible]

to motion of the [illegible] tween the calcd. and exptl. values should be a measure of its [illegible] contributs it. However, this effect would [illegible] strongly by a molecule like Me(H)[illegible] has been partially calcd. previously (cf. C.A. 49, 9370h).

F. J. Murrell

POLAND/Physical Chemistry - Molecule. Chemical Bond. B-4

Abs Jour : Referat Zhur - Khimiya, No 6, 25 March 1957, 18203

Author : Kolos
Inst :
Title : Effective Cross-Section of the Molecule of Methyl Mercaptan for Dispersing Slow Neutrons.

Orig Pub : Bul. Polskoy AN. 1956, Otd. 3, 4, No 5, 263-265

Abstract : Work on computation of an effective cross-section of molecules for dispersing slow neutrons is continued (RZhKhim, 1955, 54457). For computation of proton effective cross-section the association of molecules in liquid state is taken into consideration. Intramolecular bonds in associated complexes can hinder a free rotation of molecules which results in increasing effective cross-section of protons in comparison with the case of a free rotation of molecules. This was not taken into consideration in previous work where the difference between a computed and an

Card 1/4 - 37 -

where

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state, respectively. In this formula there is a typographical error in the previous work. For computation the height of the potential barrier was taken equal to

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Abs Jour : Referat Zhur - Khimiya, No 6, 25 March 1957, 18203

705 cal/mol. As the energy of the bond O-H...O is considerably greater than the energy of S-H...S, the association is small in case of CH_3SH in comparison with the case of CH_3OH. Therefore, the agreement of the experimental and computed effective cross-section for CH_3SH will mean that the influence of the association upon effective cross-section does not exists and that the presupposed appraisal of the influence of vibrations of protons upon the effective cross-section is correct. Curves of the dependence of effective cross-section of the molecule CH_3SH are given. For computations the height of potential barrier is taken equal to 705 cal/mol without and with taking into consideration the influence of vibrations of protons as a function of the initial energy of the neutron.

KOLOS, W.

"A certain connection between science and politics."

p. 15 (Kosmos, Serbia B: Przyroda Nieozywiona) Vol. 3, no. 1, 1957
Warsaw, Poland

SO: Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 4, April 1958

Kolos, W.

KOLOS, W.

On the one-center interaction integrals in the molecular orbital method.

p. 299 (Acta Physica Polonica) Vol.15, no. 3, 1957, Warszawa., Poland

SO: MONTHLY INDEX OF EAST EUROPEAN ACCESSIONS (EEAI) LC, VOL. 7, NO. 1, JAN. 1958

Kolos, Wlodzimierz

POLAND/Atomic and Molecular Physics - Physics of the Nucleus D-8

Abs Jour : Ref Zhur - Fizika, No 6, 1958, No 12871

Author : Kolos Wlodzimierz
Inst : Polish Academy of Sciences, Warsaw
Title : Electron Correlation in Molecules.I. The Ethylene Molecule

Orig Pub : Acta phys. polon, 1957, 16, No 4, 257-266

Abstract : As is known, calculation of the electron correlation in the molecular-orbit method leads in general to gread difficulties. In connection with this, the author proposes a method for partial accounting for the electron correlation, which takes into account only the electrostatic correlation of the electrons with oppositely-directed spins, belonging to one pair, and neglects the electrostatic correlation of the electrons with like spins and of electrons with opposite spins but belonging to different pairs. The method can be used successively for the calculation of the excitation energy of conjugated hydrocarbonates and it is illustrated with ethylene as an example. Using π-electron wave functions in the interaction

Card : 1/2

Card : 2/2

KOLOS W.

POLAND/Atomic and Molecular Physics - Physics of the Molecule. D

Abs Jour : Ref Zhur Fizika, No 8, 1959, 17569

Author : Kolos, Wlodzimierz

Inst : Institute of Physics, Polish Academy of Sciences, Warsaw Poland

Title : On the Electron Density Distribution in Molecules.

Orig Pub : Acta phys. polon., 1958, 17, No 2-3, 201-202

Abstract : General ideas are expressed concerning the character of the distribution of the electron density in simple molecules. The wave function of the system is represented in the form of a product of Slater single-electron atomic orbits and a correction factor, which takes into account the neutral perturbation; itsform i.e., indeed determined by the electron density distribution in the molecule. -- K.P. Gurov

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- 45 -

19

Distr: 4E2c(j)/4E3d 7 21 5 22-MAY 2

A method of interpretation of absorption spectra of complex ions. Włodzimierz Kołos (Polish Acad. Sci., Warsaw). *Roczniki Chem.* 32, 329-38(1958)(English summary).—The H-like atom with one electron is considered to account for the electronic configurations of various atoms. The latter may be found by solution of Schrödinger's equation, giving a set of corresponding at. orbitals, and by filling the orbitals successively with electron pairs. Similarly, the solution for one-electron atom in an outer sym. field was used to explain the features and origin of absorption spectra of complex atoms by taking the results of Ilse and Hartmann (*C.A.* 46, 7874e) and of Ballhausen (*C.A.* 49, 9383b). The 5-fold degenerated *d* state splits up by action of outer field, depending on the symmetry of perturbation. The split levels were filled with electrons, allowing for the exclusion principle, with the assumption that the perturbation did not change the multiplicity of the ground state. The excitation energies of some complex ions were calcd. by the use of empirical parameters (one for O_h as in Co^{++} complexes, and another for D_4 symmetry as in $(Ni.aq._6)^{++}$) and found to agree reasonably with expti. data. In the case of Cu^{++} complexes the values are identical with those resulting from the crystal field theory. A. Kręglewski

JB 1/1

POLAND/Solid State Physics - Solid State Theory

Abs Jour : Ref Zhur - Fizika, No 1, 1959, No 790

Author : Kolos Wlodzimierz
Inst : Electrochemical Division Institute of Chemical Physics, Polish Academy of Sciences, Warsaw, Poland

Title : Stability of Certain Complexes Having a Coordination Number of 4.

Orig Pub : Roczn. chem., 1958, 32, No 2, 393-395

Abstract : The theory of crystalline fields (in the strong-field approximation) is applied to the calculation of the relative stability of the quadratic and tetrahedral complexes Cu (II), Ni (II), and Co (II). It follows from the calculations that from among the tetrahedral, ones the most stable are the complexes Co (II), while the complexes Ni (II) are the most stable among the quadratic ones. These results are in agreement with the experimental data.

Author's resume

Card : 1/1

82709
P/046/60/005/001-2/003/008
A222/A026

5.3100
AUTHOR: Kołos, Włodzimierz

TITLE: On the Reactivity of Certain Ionized Hydrocarbons

PERIODICAL: Nukleonika, 1960, No. 1-2, pp. 73-80

TEXT: Charge distributions, bond orders and free valencies have been calculated for butadiene, hexatriene, naphthalene, anthracene, 1.2-benzopyrene and 1.2-3.4-dibenzopyrene. The corresponding molecular diagrams are presented in Fig. 1-3, where a) refers to the ionized and b) to the neutral molecules. The author hopes that the results may be helpful in understanding some elementary processes occurring in radiosyntheses. The calculus refers to the theory of molecular orbitals in the Hückl approximation. Atomic orbital overlap integers have been ignored. Molecular orbitals for electrons thus were assumed as

$$\psi_i = \sum_r c_{ir} \varphi_r \qquad (1)$$

Card 1/3

On the Reactivity of Certain Ionized Hydrocarbons

where φ_r is the $2p_z$ orbital of the r-th carbon atom, and the indicator r skips all carbon atoms belonging to the system of conjugate bonds. The coefficients c_{ir} respond the condition of normalization

$$\sum_r |c_{ir}|^2 = 1 \qquad (2)$$

The charge at the atom r originating from the π electrons is defined by the formula

$$q_r = \sum_i m_i |c_{ir}|^2 \qquad (3)$$

where m_i is the number of electrons (in the molecule), whose condition is described by the ψ_i function. Further calculus applicable for alternant hydrocarbons (all compounds dealt with in the article) is cited from references 1 through 5. It has been proved that in ionized polyenes the largest electric charge must be located at the ends of the chains. Proof has been found for a smoothing effect of the ionization on bond orders and an increase in free valencies of carbon atoms at the ends of

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A222/A026

On the Reactivity of Certain Ionized Hydrocarbons

the molecules. The largest electric charge in ionized naphthalene and anthracene molecules must be located in the α and mezo positions respectively, and the smallest charge in the β positions. Apparently, the points most susceptible to attack in reactions with electrophilic and nucleophilic reagents are determined by these charge distributions. There are 3 figures and 7 non-Soviet references.

ASSOCIATION: Instytut Badań Jądrowych PAN, Pracownia Chemii Radiacyjnej (Institute of Nuclear Research, PAN, Laboratory of Radiation Chemistry), Warsaw, Instytut Chemii Fizycznej PAN, Zakład Elektrochemii (Institute of Physical Chemistry, PAN, Department of Electrochemistry), Warsaw

SUBMITTED: December 1959

Card 3/3

27316
P/046/60/005/011/005/018
D249/D303

21.6000
AUTHOR: Kołos, Włodzimierz

TITLE: Ionization of molecular gases by β-particles

PERIODICAL: Nukleonika, v. 5, no. 11, 1960, 719 - 726

TEXT: The average energy, W, required to produce an ion pair exceeds the ionization potential, I, to an extent depending on the ratio of the probabilities of excitation and ionization, since a part of W merely raises the molecule into a higher energy level. A brief summary of Western work in this field is given. Contrary to early experimental indications, the theory of excitation and ionization of atoms by fast particles predicts a correlation between W and I, and shows a dependence of W on the generalized oscillator strengths for the excitation of a given atom. The relationship between W and I has recently been confirmed by experiment, being nearly linear for the inert gases. For the same value of I, the values of W are appreciably lower for the monatomic that for the di-

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Ionization of molecular ....

atomic gases. In the present work, hydrogen is used to indicate, on theoretical grounds, that the average energy required to produce an ion pair by β-particles should be greater for diatomic than for monatomic gases. The total cross-section for inelastic collisions is divided into (1) σ_e, corresponding to inelastic collisions leading to the excitation of discrete levels with an average excitation energy E_e, and (2) σ_{i1} and σ_{i2}, corresponding to inelastic collisions which lead to ionization and produce secondary electrons with kinetic energies E_{i1} and E_{i2}, where $E_{i1} < I < E_{i2}$. Assuming W to be independent of the energy of impinging electrons:

$$W = \frac{\sigma_e E_e + \sigma_{i1} (I + E_{i1}) + \sigma_{i2} I}{\sigma_{i1} + \sigma_{i2}}. \qquad (1)$$

Using this equation and the cross-sections calculated by H. Bethe (Ref. 6: Handbuch der Physik. Bd. 24 T.I. Berlin 1933, Springer Verlag) for the various excitations in H-atoms by the first born

Ionization of molecular ...

approximation, the following table is constructed:

Table 1. Energy of primary electrons, in kV	100	10	1	0.2
W, in eV per ion-pair	36	34.5	33	27

For hydrogen, up to 50 % of ionization is due to secondary electrons with low energies, for which the Born approximation is not valid. From the above table, W appears to be energy dependent, although this may not be true when all the energies of primary and secondary electrons and the energy distribution are taken into account. Experimental values of W for molecules disagree with those calculated for free atoms by Eq. (1), probably due to the difficulty of calculating precisely the cross-sections for various inelastic collisions. Collision of an electron, with an H_2 molecule is considered, which raises the molecule from the ground to the excited state and the change of momentum is assumed to be small. Using wave mechanics, it is shown semi-qualitatively that the formation

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Ionization of molecular ...

of a diatomic molecule increases the cross-section for the excitation of discrete energy levels (σ_e). It is pointed out that little is known about molecular wave functions for excited states and that the transition probabilities are very sensitive to the form of wave functions employed. Only a very accurate calculation could, therefore, give conclusive results. Experimental values of the ionization cross-sections, obtained by Western authors for H-atoms, agree with the theoretical ones for energies > 250 ev, but for lower energies the theoretical values are significantly higher. The experimental values for the H_2 molecule are available for comparison with those of 2 H-atoms and tend to support the author's conclusions. There are 1 figure, 1 table and 10 non-Soviet-bloc references. The 4 most recent references to the English-language publications read as follows: W.P. Jesse, J. Sadauskis, Phys. Rev. 90, 1120, 1953; T.E. Bartner, G.S. Hurst, Phys. Rev., 93, 1236, 19[illegible]; W.C. Barber, Phys. Rev., 97, 1071, 1955; J. Weiss, W. Bernstein, Phys. Rev. 98, 1828, 1955; 103, 1253, 1956; [Abstractor's note: This is given as a single reference]; W.P. Jesse, J. Sadauskis,

Card 4/5

27316
P/046/60/005/011/005/018
D249/D303

Ionization of molecular ...

Phys. Rev., 97, 1668, 1955; ibid, 107, 766, 1957; W.L. Fite, L.T. Brackmann, Phys. Rev., 112, 1141, 1958.

ASSOCIATION: Institute of Nuclear Research, Warsaw, Laboratory of Radiation Chemistry; Institute of Physical Chemistry, Warsaw, Department of Electrochemistry

SUBMITTED: September, 1960

Card 5/5

KOLOS, W.

On wave functions for the problem of electron and X-ray scattering by helium atoms. Bul Ac Pol mat 8 no.1:67-70 '60. (EEAI 9:11)

1. Laboratory of Radiation Chemistry, Institute for Nuclear Research Polish Academy of Sciences. Presented by L.Infeld.

(Helium)
(Electrons)
(X rays)
(Eigenfunctions)

21305

P/045/61/020/002/002/006
B108/B209

24.4500

AUTHORS: Kołos, W., Wolniewicz

TITLE: Coupling between electronic and nuclear motions, and relativistic effects in the ground state of the H_2 molecule

PERIODICAL: Acta Physica Polonica, v. 20, no. 2, 1961, 129-140

TEXT: The authors calculated the contributions made by the coupling between nuclear and electronic motion and relativistic effects to the binding energy of the hydrogen molecule, since these contributions must be known for comparing experimental values with the lowest eigenvalue of the nonrelativistic Hamiltonian calculated for the H_2 molecule having a fixed nucleus with the experiment. The coupling between nuclear and electronic motion changes the molecular energy in first approximation by the expression

$$E' = E - E_0 = \int \Psi^* H' \Psi \, d\tau_1 \, d\tau_2. \qquad (4)$$

(Ref. 2: Dalgarno, A. and McCarroll, R., Proc. Roy. Soc., 237, 383 (1956)). The wave function is assumed to be real and given by the expansion

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Coupling between ...

$$\Psi = \sum_i c_i(R)\,\Psi_i(\xi_1, \eta_1, \xi_2, \eta_2 \varphi_1, \varphi_2), \qquad (3)$$

where ξ_i and η_i are elliptic coordinates with respect to R, and φ_i is the azimuthal angle of the i-th electron. For the calculation of the expectation value of $\Delta_{\vec{R}}$ ($\vec{R}$ denotes the relative coordinate of the nuclei), this operator is expressed in terms of ξ_i, η_i, φ_i, R, θ, and ϕ (θ and ϕ are the polar angles of R). The resulting expression may be simplified if one restricts the problem to wave functions of the form

$$\Psi = \sum c_k^p(R)\, g_k(\xi_1, \eta_1, \xi_2, \eta_2)\, \chi^p(\xi_1, \eta_1, \xi_2, \eta_2, \varphi) \qquad (5)$$

where $\varphi = \varphi_1 - \varphi_2$, and $R^p\chi^p$ is a homogeneous function of p-th order of the position vector $\vec{r}_i$ of the i-th electron only. Thus, one obtains

$$\int \Psi\, \Delta_R\, \Psi\, d\tau_1\, d\tau_2 = \sum_{k,p} \int \Psi\, R^p \chi^p\, \Delta_R\, R^{-p} c_k^p g_k\, d\tau_1\, d\tau_2. \qquad (7)$$

where all terms containing derivatives with respect to any angle and, due to the symmetry $\chi^p(\varphi + 2\pi) = \chi^p(\varphi)$, all terms linear in $\cos\varphi_i$ or $\sin\varphi_i$ may be

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omitted. It is pointed out that for solving Eq. (7) one must know the derivatives $\frac{d\Psi}{dR}=\sum\frac{dc_k}{dR}\Psi_k$. For the calculation of the relativistic correction it is necessary to use the Hamiltonian given by Bethe, H. A. and Salpeter, E. E. (Ref. 1: Encyclopedia of Physics, 35/1, 267 (1957)). Thus, $E_{rel}=\int\Psi H_{rel}\Psi d\tau = E_1+E_2+E_3+E_4+E_5+E_6$. For the ground state of the H_2 molecule, E_3 and E_6 are zero, and if use is made of the symmetry of Ψ, the non-vanishing constributions to E_{rel} read

$$E_1=-\frac{\hbar^4}{4m^3c^2}\int(\Delta_1\Psi)^2\,d\tau_1\,d\tau_2,$$

$$E_2=-\frac{e^2}{2(mc)^2}\int\Psi\frac{1}{r_{12}}\left[p_1\cdot p_2+\frac{r_{12}(r_{12}p_1)\,p_2}{r_{12}^2}\right]\Psi\,d\tau_1\,d\tau_2,$$

$$E_4=\frac{4\pi^2e^2\hbar^2}{(2mc)^2}\int\Psi\Psi[2\delta(r_{1e})-\delta(r_{12})]\,d\tau_1\,d\tau_2,$$

$$E_5=\frac{8\pi e^2\hbar^2}{(2mc)^2}\int\Psi\Psi\,\delta(r_{12})\,d\tau_1\,d\tau_2, \qquad (16)$$

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Results: The wave function the authors employed was of the form

$$\Psi = \frac{1}{2\pi} e^{-\alpha(\xi_1+\xi_2)} \sum_{i=1}^{n} c_i(R)\, g_i, \quad n = 1, 2, 3, 4, 5, \tag{18}$$

where

$$g_1 = 2, \quad g_2 = \eta_1^2 + \eta_2^2, \quad g_3 = 2\eta_1\eta_2,$$
$$g_4 = \xi_1 + \xi_2, \quad g_5 = 2\left[(\xi_1^2 - 1)(1 - \eta_1^2)(\xi_2^2 - 1)(1 - \eta_2^2)\right]^{1/2} \cos(\varphi_1 - \varphi_2). \tag{18}$$

All calculations have been carried out for the internuclear distance R = 1.4 au and using $\alpha = 0.95$. The coefficients $c_i(R)$ as well as E_0, i. e., the expectation value of H_0, and the corresponding binding energies D are given in Table I. The coupling corrections computed with the aid of four wave functions are presented in Table II, where

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$$E_1' = -\frac{\hbar^2}{M}\int \Psi \Delta_R \Psi d\tau_1 d\tau_2,$$

$$E_2' = -\frac{\hbar^2}{4M}\int \Psi(\Delta_{r_1} + \Delta_{r_2})\Psi d\tau_1 d\tau_2,$$

$$E_3' = -\frac{\hbar^2}{2M}\int \Psi \nabla_{r_1}\nabla_{r_2}\Psi d\tau_1 d\tau_2$$

in au/M (= 119.47 cm^{-1}) and $E' = E_1' + E_2' + E_3'$ in cm^{-1}. The relativistic corrections have been calculated with the aid of all five wave functions. The results in cm^{-1} ($\frac{\alpha^2}{2}$ au = 5.844 cm^{-1}) are presented in Table III, where $E'' = E_{rel} - E_2$. The results obtained by J. Ladik (Ref. 6: Acta phys. Hungar., 10, 271 (1959)) with the Wang wave function are also given in Table III. Addition of the calculated corrections to the accurate non-relativistic result for infinitely heavy nuclei gives the theoretical binding energy D = 38,280 cm^{-1}, the experimental value being D = 38,286±6 cm^{-1}. There are 3 tables and 8 non-Soviet-bloc references.

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SUBMITTED: July 21, 1961

n	E_0 (au)	D (eV)	c_1	c_2	c_3	c_4	c_5
1	−1.08612	2.343	4.07284				
2	−1.11544	3.141	3.45343	2.03585			
3	−1.13560	3.690	3.38893	2.16629	−1.47897		
4	−1.15165	4.126	1.73628	2.00821	−1.38824	0.82506	
5	−1.16081	4.376	1.70621	1.95257	−1.35017	0.84280	−0.16518

Table 1

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AUTHOR: Kołos, Włodzimierz

TITLE: Approximate wave functions in the calculation of electron excitation accompanying the beta decay of He^6

PERIODICAL: Acta Physica Polonica, v. 20, no. 2, 1961, 175-178

TEXT: The purpose of the present study is to show the probability of non-excitation of atomic electrons in the beta-decay of He^6. In publications the suggestion has been made to use self-consistent field wave functions in the calculation of the mean beta-induced ionization in order to improve the results. The main effects in beta decay come from the shaking of the nucleus due to a change in charge. In perturbation theory, the probability of finding the daughter Li^+ ion in its n-th quantum state is given by $P_{0n} = \left|\int \varphi_0 \psi^*_n d\tau\right|^2$, where φ_0 denotes the ground-state wave function of the helium atom, and ψ_n the wave function for the n-th state of the Li^+ ion. $\sum_n P_{0n} = 1$, where $\sum_n$ indicates summation over all states in the discrete spectrum or

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integration over the continuous spectrum. The author calculated P_{00} (for the ground state) for He with the following wave functions obtained by the self-consistent field method:

$$\varphi_{01} = N_1 e^{-\zeta(r_1+r_2)} \quad (3)$$

$$\varphi_{02} = N_2 \chi(r_1)\chi(r_2), \quad (4)$$

$$\varphi_{03} = N_3 [e^{-\zeta_1 r_1 - \zeta_2 r_2} + e^{-\zeta_2 r_1 - \zeta_1 r_2}], \quad (5)$$

$$\varphi_{04} = N_4 e^{-\zeta(r_1+r_2)}(1 + cr_{12}), \quad (6)$$

$$\varphi_{05} = N_5 e^{-\zeta(r_1+r_2)}[1 + c_1 r_{12} + c_2 (r_1 - r_2)^2], \quad (7)$$

where χ represents the self-consistent field orbitals computed by Weiss, A. (Ref. 6: Unpublished results, The University of Chicago (1958)) in the form of expansion in terms of the Laguerre polynomials

$$\chi(r) = e^{-\zeta r} \sum_{m=1} a_m L^2_{m+1}(2\zeta r). \quad (8)$$

For the Li^+ ion, the functions ψ_{0n}, which have the same form as φ_{0n}, have

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been employed. In Eq. (8), a five-term expansion and, for helium, also a three-term expansion (corresponding wave function φ'_{02}) have been used. The six- and seven-term wave functions used by Winther, A. (Ref. 7: K. Danske Vidensk. Selsk. Mat.-fys. Medd., 27, No. 2 (1952)) for He and Li^+ are denoted by φ_{0w} and ψ_{0w}, respectively. The results achieved for P_{00} and for the total energy of both systems are given in Table 1. As the P_{00} results are very unsatisfactory, the author computed the expectation values of r and r^2 for helium, using the wave function $\varphi_{01}, \ldots \varphi_{05}$ (Table 2). r_{ac} denotes the accurate expectation value. In this case, the self-consistent field method yields good results. The author points out that the probability P_{00} should be calculated with much more accurate wave functions before drawing conclusions on the applicability of the self-consistent field wave method to this problem. The author thanks A. Weiss for sending him the unpublished results of his self-consistent field calculations. There are 4 tables and 7 non-Soviet-bloc references.

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Table I

Values of P_{00} calculated with various wave functions

Wave functions	φ_{01}, ψ_{01}	φ'_{02}, ψ_{02}	φ_{03}, ψ_{03}	φ_{04}, ψ_{04}	φ_{05}, ψ_{05}	φ_{0w}, ψ_{0w}
P_{00}	0.7247	0.7317	0.7314	0.7110	0.7174	0.6859	0.6698
— Energy (au)	10.0700	10.0980	10.0981	10.1247	10.1516	10.1707	10.1827

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KOLOS, Wlodzimierz; KOSEK, Stanislaw

Cerenkov radiation in the ^{60}Co gamma irradiation unit.
Nukleonika 7 no.6:379-388 '62.

1. Institute of Nuclear Research, Polish Academy of Sciences, Warsaw, Department of Radiation Chemistry.

KOLOS, Wlodzimierz

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